

2/26/18

"Some are born to greatness, some achieve greatness, and some have greatness thrust upon them"
- William Shakespeare

HW: "Introduction to Functions" finish the packet

AIM: What is a function?

Warm Up:

1) Solve, and express the answer in set builder, and interval notation: $x^2 - 13x > 48$

$$\begin{array}{l}
 x^2 - 13x - 48 > 0 \\
 (x+3)(x-16) \\
 -3 \quad 16
 \end{array}$$

$\xrightarrow{\text{GO L I}}$
 open circles

$$\begin{array}{c}
 \xleftarrow{\hspace{1cm}} \quad \xrightarrow{\hspace{1cm}} \\
 \begin{array}{cc}
 \bigcirc & \bigcirc \\
 -3 & 16
 \end{array}
 \end{array}$$

SB: $\{x \mid x < -3 \text{ or } 16 < x\}$
Int: $(-\infty, -3) \cup (16, \infty)$

1) A relation is a set of unique ordered pairs. Here are a few examples:

$\{(1, 5) (3, 2) (8, 8) (1, 4) (7, 19.4)\}$

$\{(1, a) (2, b) (3, c) (4, d) (5, e)\}$

$\{(3.2, -90) (\text{pizza}, 435) (-2.9, \text{dishwasher}) (a, A)\}$

$\{(0, 0)\}$

2) A function is a special relation where the x-values **do not repeat**. Determine whether each of the following is a function:

$\{(A, 1) (B, 2) (C, 3) (D, 4) (E, 5)\}$ *yes*

$\{(9, 0.2) (33, -77) (4, -2) (0, 0) (8, 9)\}$ *yes*

$\{(1, 3) (2, 3) (9, 3) (-12, 3) (b, 3)\}$ *yes*

$\{(\textcircled{0.2}, -67) (3, h) (\text{red}, 5) (23, 9.1) (\textcircled{0.2}, 55)\}$

Not a function

3) There are **several ways** to describe/think about functions.

a] A function is a special relation whose x-values do not repeat, but the y values can repeat.

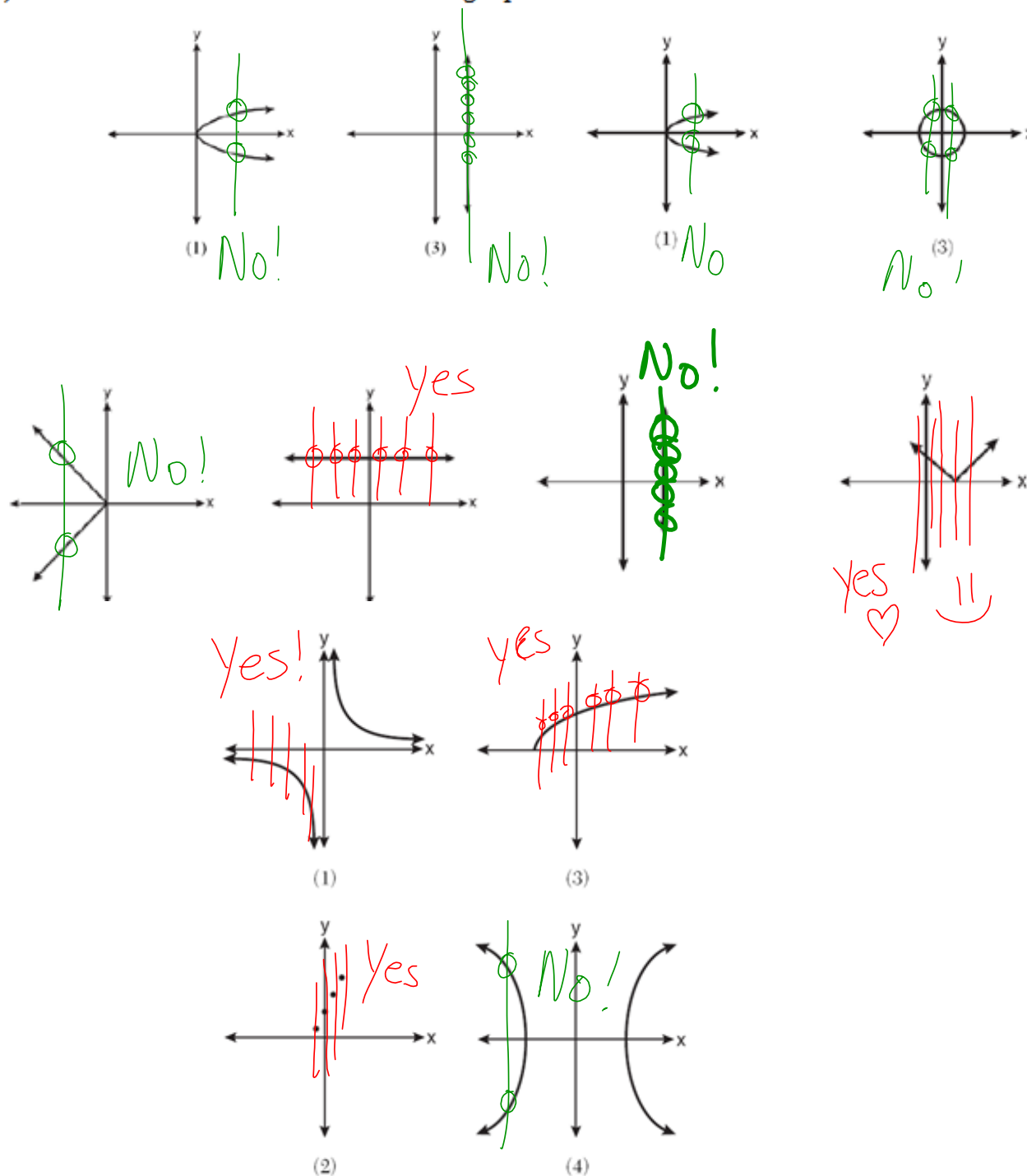
b] A function is a rule which assigns every x value **one, and only one** y value.

c] The graph of a function will pass the "vertical line test".

What is the vertical line test?

4) The Vertical Line Test: Since the x values are not allowed to repeat, no vertical line should ever hit the graph of a function more than once.

*5) Determine whether each of the following represents a function:



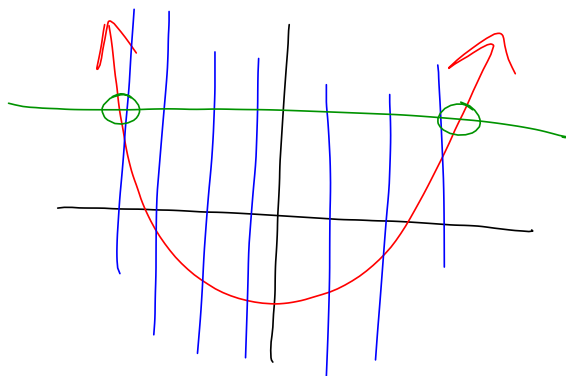
6) A function is called one-to-one if its y values **do not repeat**.

*That means that a one-to-one function has no repeating X or Y values.

*That means that a **one-to-one** function will pass both the vertical line test,

and the horizontal line test.

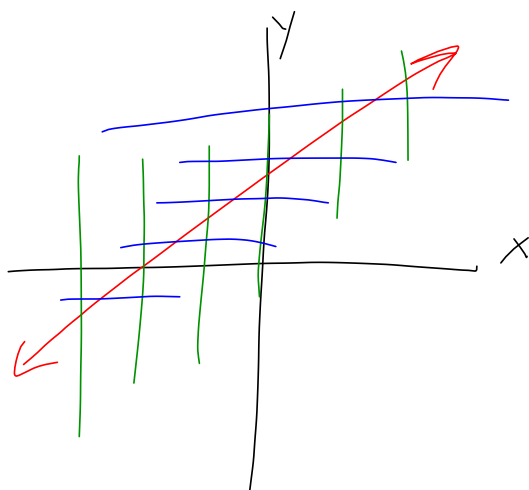
7) Determine whether each of the following functions is **one-to-one**:



Passes Vert. Line test

Fails Horiz. Line test

Therefore Not
one to one.



Pass V.L.T.

Pass H.L.T

Therefore it is
a one to One
function

8) A function is called onto if it uses every y value that it is entitled to.

9) Determine whether each of the following functions is **onto**:

10) Can you summarize the main points from today?

A] A relation is a set of unique _____.

B] A function is a relation whose _____ values do not repeat.

Functions pass the _____ test.

C] A function is one-to-one if its _____ values do not repeat.

One-to-one functions also pass the _____ test.

D] A function is called onto if it uses all of the y values that it can.